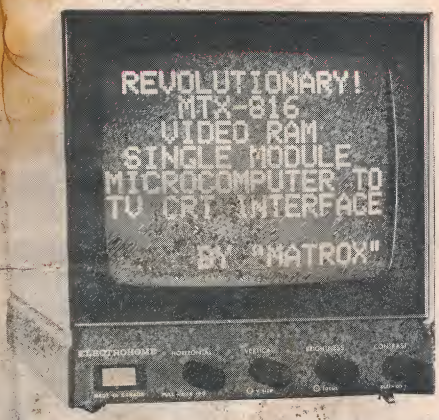
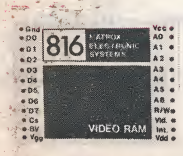
Apr 77

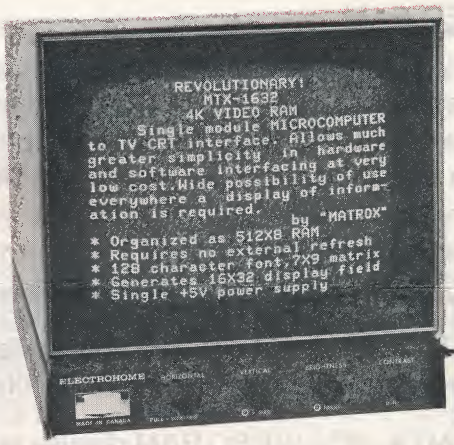
MATROX TV CONTROLLER FAMILY

THE BEST WAY TO DISPLAY DATA



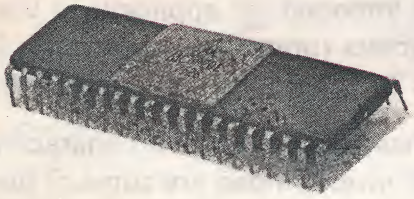
MTX-816



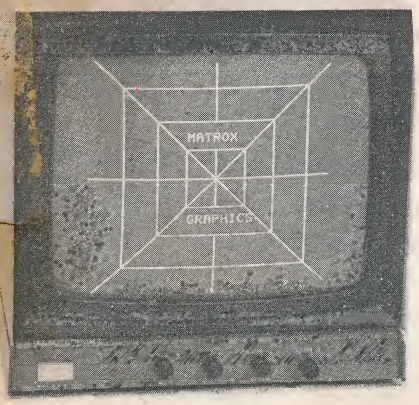


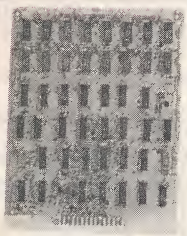
MTX-1632

μP

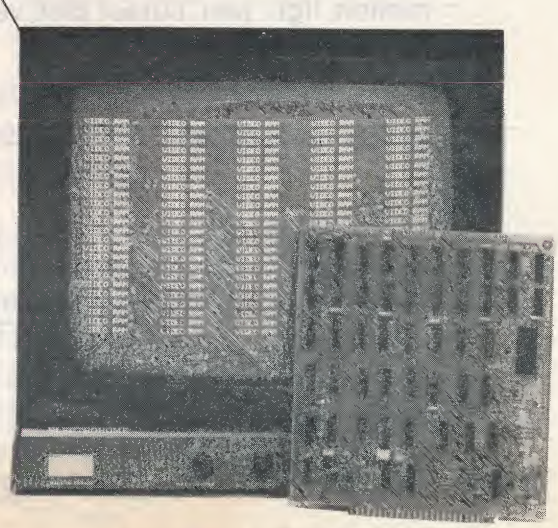


MTX-256★★2





MTX-2480



matrox electronic systems

P.O. BOX 56, AHUNTSIC STN., MONTREAL, QUE. H3L 3N5
TEL.: (514) 481-6838 TELEX: 05-825651

The family of MTX controller modules has been primarily designed for mini and microcomputer applications with the following objectives in mind:

- minimization of required components
- simplicity of software and hardware interfacing
- versatility
- high speed
- reliability
- low cost

VIDEO RAM

Every computer system requires a number of I/O interfaces to communicate with various peripheral devices. A new and different design approach for interfaces is necessary if they are to be effectively used in microcomputer systems. The architecture of the interface has to be such that the peripheral device can be easily connected to the CPU (hardware and software). Secondly, to save CPU time the I/O interface should control the peripheral device with minimum supervision from the CPU. Furthermore, the I/O interface has to be microprocessor compatible with regard to size, power consumption, speed and cost.

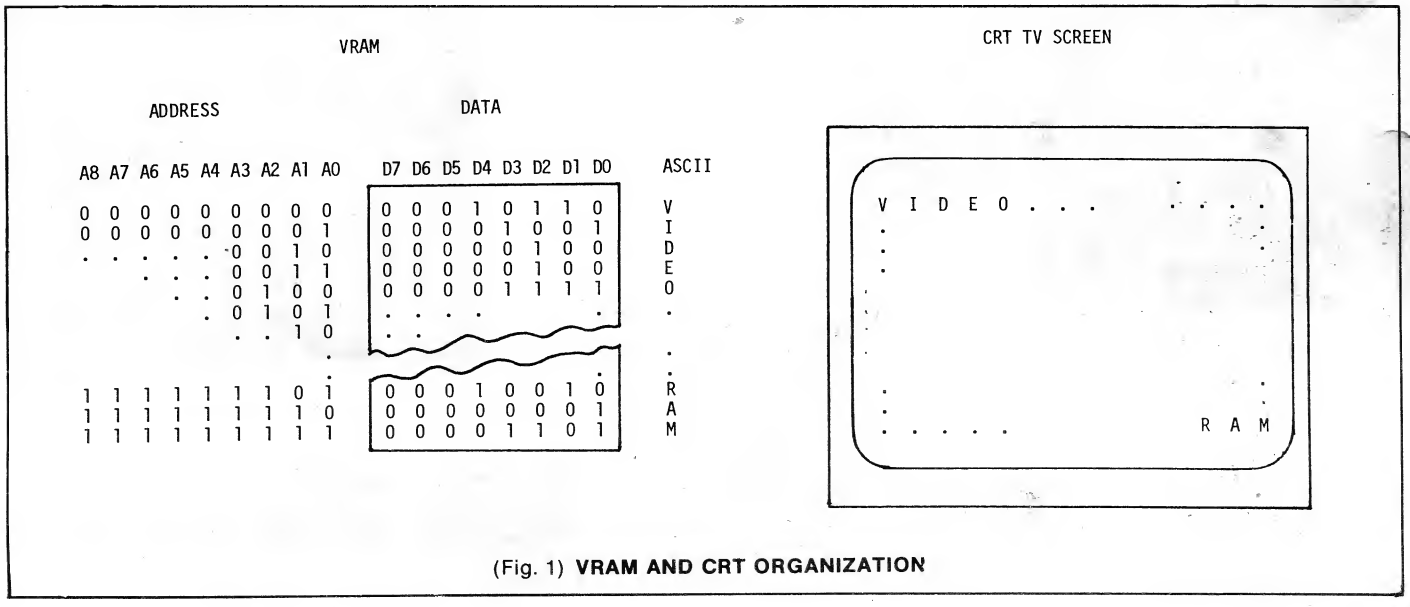
The MTX family of TV CRT controllers has been designed to meet the above requirements. Several types of controllers are available.

The MTX—816 VIDEO RAM display is organized in 8 lines x 16 characters. Applications of this RAM are mainly found in systems requiring display of large characters (navigation, communication, process control, test equipment).

The MTX-1632 VIDEO RAM is intended for applications that require the display of a large number of alphanumeric characters (upper and lower case; Greek letters, symbols). The display is organized in 16 lines of 32 characters each (total 512).

The MTX-2480 VIDEO RAM displays 24 lines of 80 characters each (total 1920). Upper and lower case, half intensity, blink, inverse video are some of the standard features of this RAM.

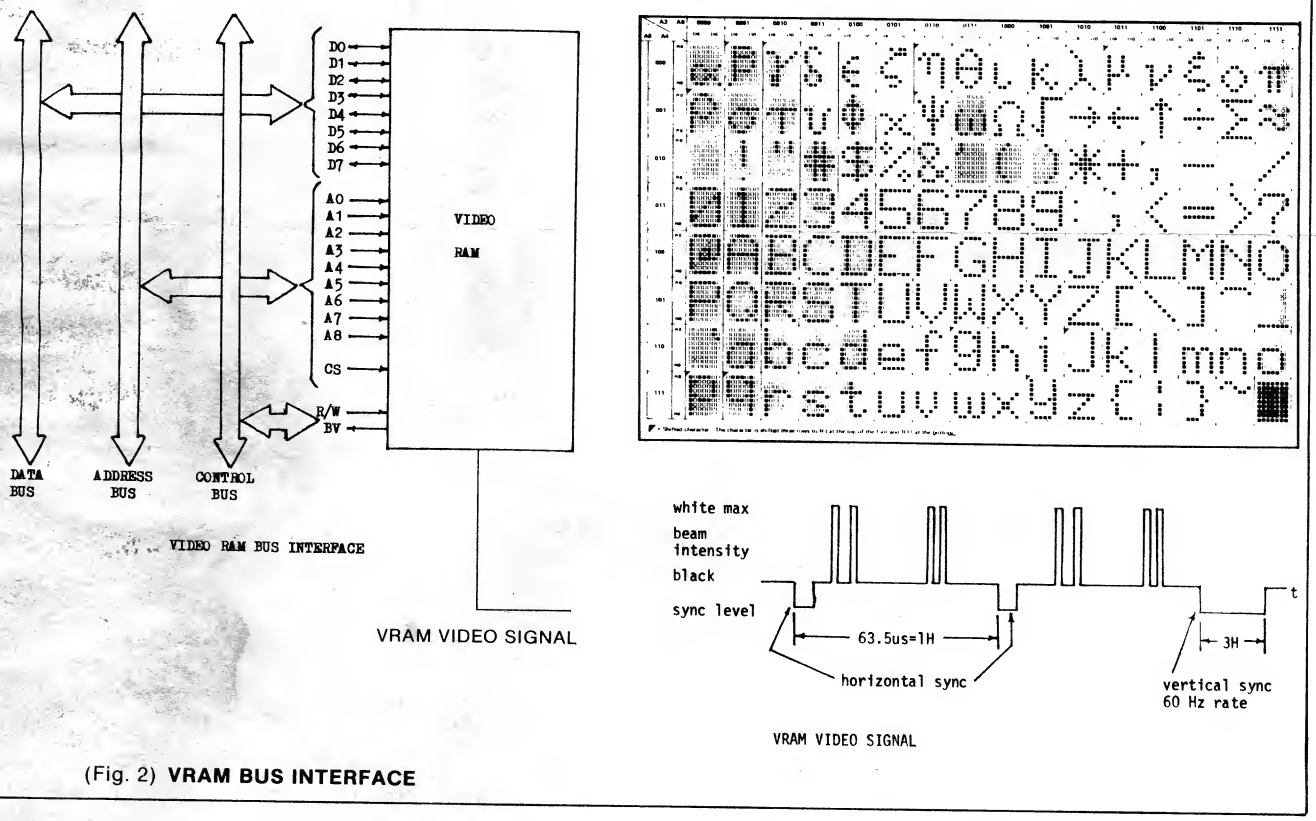
The MTX-256★★2 GRAPHIC SYSTEM is a unique modular graphic system which displays a 256 x 256 dot raster on any monochrome or colour TV monitor. Grey scale, colour, image motion, light pen, cursor plot, vector plot, point plot, alphanumerics and ROM screen patterns are easily implemented.



(Fig. 1) **VRAM AND CRT ORGANIZATION**

INTERFACING TO A MICROCOMPUTER

On the input side a VRAM looks like a static random access memory and it can be directly connected to the data and address bus of a typical microprocessor system. Each character position on the screen is equivalent to a memory location. It can be written into and read out the same way as any other RAM in the microprocessor address space. The content of a video memory location determines the character to be displayed. Various display effects can be accomplished with the availability of the Read/Write feature.



(Fig. 2) **VRAM BUS INTERFACE**

The VRAM bus interface shown in Fig. 2 demonstrates the simplicity of interface to a typical bus system. Data, address and control lines can be connected without buffers. The CS (chip select) input is used to select the VRAM in the microprocessor address space.

A CRT display is refreshed at a 60 Hz rate. However, there is no need for the CPU to refresh the VRAM; once written a character is continuously displayed until a new character is rewritten into a location. This unique feature is a significant improvement over the commonly used DMA approach, since it requires no CPU time for refresh. The VRAM refreshes the picture automatically, scanning continuously the internal memory to produce a video signal. The video signal consists of horizontal and vertical sync. pulses (used to synchronize the TV scan) and the video portion which modulates the intensity of the electronic beam. During horizontal and vertical synchronization there is no video displayed to allow for the beam flyback.

DRIVING THE TV MONITOR

A VRAM produces a composite video signal which drives directly any standard TV monitor. A 75 Ohm output impedance permits connection of a 75 Ohm cable of up to 2000 feet to drive a terminated TV monitor. Synchronization frequencies are crystal controlled so that low cost TV monitors can be used without picture degradation. Short circuit protection on the video output is built in (video only and sync. signals are also available as separate outputs).

	MTX-816	MTX-1632	MTX-2480	MTX-256★★2
DISPLAY FIELD	8x16	16x32	24x80	256x256
CHARACTER MATRIX	5x7	7x9	7x9/5x7	DOT
CHARACTER SET	64	128	128/64	GREY/COLOR
UPPER/LOWER CASE	NO	YES	YES	—
BLINK	NO	YES	YES	—
1/2 INTENS; INVERSE VID.	NO	NO	YES	YES
COMPOSITE VIDEO	YES	YES	YES	YES
AMERICAN TV STD. (60 Hz)	YES	YES	YES	YES
EUROPEAN TV STD. (50 Hz)	YES	YES	YES	YES
COLOR	NO	NO	NO	YES
REMOTE DISPLAY	YES	YES	YES	YES
NO. OF CHARACTERS	128	512	1920	65,536
PACKAGING	MODULE	MODULE	PC BOARD	PCB
DIMENSIONS (INCHES)	3.2x4.4x.6	3.9x4.4x.5	7x7.5	8.5x7
CONNECTIONS	24 PINS	28 PINS	CONN.(44 PINS)	CONN.(44 PINS)
OPERATING TEMP.	0-70 C	0-70 C	0-70 C	0-70°C
POWER SUPPLY (MAX.)	+5V, 200mA	+5V, 600mA	+5V, 1.5A	+5V, .4A;+12V .12A
COMPATIBILITY	CMOS,TTL	TTL	TTL	TTL
WRITE ACCESS TIME ns	900	650	500	80
READ ACCESS TIME ns	975	450	500	-
MEMORY ORGANIZATION	128x8	512x8	4096x9	65,536x1
PRICE (SINGLE)	$ 179	$ 225	$ 395	$ 630
PRICE (2-9)	$ 173	$ 210	$ 370	$ 605

OPTIONS: - MTX-1632 SL VRAM module (external sync. version of MTX—1632) can be synchronized from the external TV sync. source (TV camera, MTX-256★2). This unit provides alpha-numerics which can be added to the TV camera video or graphics signal.

- All VRAMs are available in American (60 Hz) or European (50 Hz) TV standard.

- MTX-1632 and MTX-2480 have several character fonts available including: ASC II + Greek, ASC II + French, + European, Japanese Kata-Kana, etc. (ASC II + Greek letters is the standard character font).

- MTX-256★★2 with one level intensity for each dot is available as one PC Board.

- MTX-256★★2-C graphic system is available as one PC Board. The PC Board provides 8 colors and/or 8 level grey scale. The MTX-256★★2-C has the same physical and electrical characteristics as the black and white MTX-256★★2-1. The price of 8 color MTX-256★★2-C is $1,390 (single).

- MTX-256★★2-1 also available as Altair/Imsai compatible card and PDP-11 bus compatible card. MTX-2480 also available as Altair/Imsai compatible card.

- Custom made character fonts, display organization and PCB dimensions available for quantity orders.

Ordering Information

All modules are available directly from MATROX Electronic Systems Ltd.

Delivery

Standard units from stock to four weeks ARO.

Further Information

Detailed data sheets and application notes available upon request.

Warranty

MATROX provides a 90 day warranty with all its products; the warranty covers parts and labour.

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